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This document presents the design changes that allow a PLANIT lesson to control ACC/OCC, VFMED, and MIOD terminals so that TACFIRE/TOS^2 systems operations can be simulated under PLANIT.

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1.0 INTRODUCTION

1.1 Requirements

This document is the description of the design changes for the PLANIT system enhancements as provided for in Phase 3 of the contract with the U. S. Army Research Institute for the Behavioral and Social Sciences No. DAHC19-76-C-0014. This document replaces the proposed document dated 15 October, 1976 which presented alternative approaches. The details of the alternative approaches have been deleted from the current document.

1.2 Scope

This document presents the design changes to allow a PLANIT lesson to control ACC/CCC, VFMED and MIOD terminals so that TACFIRE/TOS^2 systems operations can be simulated under PLANIT. The complete terminal control which will be provided to a lesson will include the following:

1. Capability to utilize the full 7-line and/or 14-line display editor (DE) screen sizes of all supported terminal types.

2. Capability to utilize both the RD and C/E D screens of the ACC/CCC.

3. Capability to control and utilize all of the ACC/CCC, VFMED and MIOD terminal switches, indicators, display formats and modes of operation.

1.3 Ground Rules and Assumptions

The following conventions and definitions apply to this document:

1. The methods and commands described for the ACC apply equally to the CCC terminal in the simulation of TOS^2 CCC operation.

2. "NORMAL MODE" - The normal mode of a PLANIT terminal.

3. "CONTROL MODE" - The mode of the terminal in which an author's lesson has complete control of the terminal.

The methods and commands described in this document are designed to allow existing lessons to run in the "NORMAL MODE" without modification to those lessons. New lessons prepared using the methods and commands described herein may make full use of the "NORMAL MODE" and the "CONTROL MODE" to provide instruction as well as simulation of ACC and VFMED operation under the TACFIRE Field Operating System.

The methods and commands described herein apply to PLANIT 2.8 and above and do not require any modifications to the PLANIT programs.

1.4 Reference Documents

PLANIT LANGUAGE EXTENSIONS THROUGH VERSION 2.8

(Charles H. Frye; March 9, 1976)

PLANIT SUPPORT PROGRAMS OPERATOR/USER MANUAL

(Litton Document No. 125200-900, Change 1)

1.5 Document Organization

This document has been organized with separate appendices for the author apparent commands and responses, so that they could be used as the basis for the preparation of author reference material. The information described in each section is briefly summarized below:

    a.   <u>Section 1</u>: This section provides general and background information related to the PLANIT System Enhancements.

    b.   <u>Section 2</u>: Discusses miscellaneous changes to the system which are not directly related to the full terminal control features.

    c.   <u>Section 3</u>: Discusses the method of full terminal control and the PLANIT, lesson and MIOP interface.

d. Section 4: Discusses items which the author must take into account.

e. Section 5: Discusses system errors and other operator terminal procedures, while Terminal #1 is being used in "CONTROL MODE" for a lesson.

f. Section 6: Provides a general description of the programming task involved.

g. Appendix A: Presents the full terminal control commands and methods including sample lessons.

h. Appendix B: Discusses the use of the message address preamble for the control of VFMED and MIOD terminals.

2.0 REQUIRED CHANGES TO THE SYSTEM

The changes discussed in the following subparagraphs are system changes not directly related to full control of the terminals. They affect the VFMED/MIOD operation and the allocation of terminal input/output buffers.

2.1 VFMED/MIOD Answer Preamble

The current VFMED/MIOD user procedures to send an answer to PLANIT calls for entering a 5-character preamble "J0000" before entering up to a 67-character answer. The 5-character preamble is inconsistant with TACFIRE and TOS^2 procedures (see Appendix B).

The User Manual and System Support Software will be modified to use a 6-character message address preamble "J00000". In either the "NORMAL MODE" or the "CONTROL MODE" the 1st and 6th characters (destination and source) characters will be verified and if incorrect will cause an error. The other characters will not be verified. This format will be consistant with messages from the computer (currently a 6-character preamble is generated). This format will also accept message address preambles that would normally be composed in a TACFIRE or TOS^2 environment. This format allows for a maximum answer length of 66 characters in the "NORMAL MODE".

2.2 Terminal Buffer Allocation

The current PLANIT support software uses an 84-character input buffer and a 1024-character output buffer for each terminal. This scheme and the I/O software associated with it has the following disadvantages:

1. The input buffer size to accommodate the full screen
    read capability would have to be increased from
    84 characters to 1036 characters.

2. An input received from a VFMED or MIOD terminal of more
    than 84 characters results in a terminal error. This
    commonly occurs when the EOT character following the
    answer is omitted.

The system support software will be modified to use a common
input/output buffer of 1048 characters as shown in Figure 1.

Start of input buffer area — | 12 characters | ⎫ Space for VFMED/MIOD
                                                  9-character generated
                                                  messages:
Start of output buffer area — | 1036 characters | Auto-Ack
                                                      Manual-Ack
                                                      Manual-Nak
                                                      Message-Request
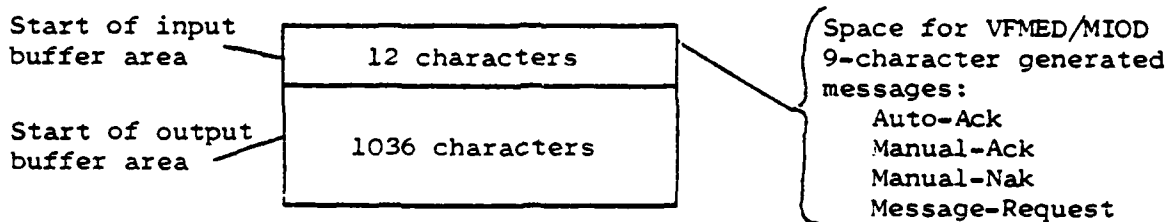
FIGURE 1.   New Terminal Buffer Allocation

The advantages of the new scheme are as follows:

1. Fewer total buffer characters are required.

2. A full screen read from the terminals is accommodated.

3. Answers from a VFMED or MIOD terminal longer than
    84 characters will not cause an error. An automatic
    EOT is generated after the last character of the
    last line of the display.

4. The first 12 characters of the common buffer are used
   to receive Auto-Ack, Manual-Ack, Manual-Nak (RE-XMIT)
   and Message-Request messages and will not affect the
   output message area, so that a RE-XMIT request can be
   processed.

The allowed receive buffer length will be controlled for a VFMED
or MIOD terminal to prevent the user from inadvertently transmitting
a full screen message at the wrong time which would destroy the output
buffer data. The allowed receiver buffer length will be as follows:

1. Normally the receive buffer length will be set to 12
   characters to accommodate any 9-character terminal
   generated messages. Longer messages will be ignored.

2. The receive buffer length will be increased to 1036
   characters (a full screen read) only after the output
   buffer has been transmitted to the terminal and
   PLANIT has a read request active.

2.3 New VFMED NO-ACK Mode

The support software will be modified to allow the selection of a
NO-ACK mode of operation taking full advantage of the new VFMED.
When selected, PLANIT text will be printed on the ELP without requiring
the student to take any switch actions. The student will read PLANIT
text only from the ELP and use the C/E display only to compose answers.
The use of the ACK switch in the NO-ACK mode is not required and will
be ignored if pressed. Pressing the RE-XMIT switch will still cause
retransmission of the last 7 (or 14) lines. After printing the last

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line of a PLANIT message, the ELP will be advanced 13 lines so that the last line will be visible to the operator on the new ELP.

The above processing is valid only for the "NORMAL MODE" of the terminal with a typical lesson. When a lesson enters the "CONTROL MODE" the lesson will control the interaction.

The NO-ACK mode will also function with the old VFMED, however the print out is not convenient to read.

It will be feasible to concurrently select the 14-LINE and NO-ACK modes realizing that printer outputs will be 14 line (or less) groups and that answers will be limited to 1-line ("NORMAL MODE") or 7-lines ("CONTROL MODE"). If the switch inside the new VFMED Display Editor is set to 14 lines, the "CONTROL MODE" answer would be the full 14-line capability.

3.0 METHOD OF IMPLEMENTATION

Two methods of implementation of the full terminal control features were
originally considered. The first was a mnemonic approach where mnemonic
commands were imbeded in the lesson text and mnemonic answers were returned
to PLANIT indicating switch actions. The second was a SPECIAL function
call approach where commands and switch actions were passed as numeric
parameters. The current approach utilizes a combination of the two
original approaches and is described in Appendix A.

Table 3-1 shows the PLANIT COMMON items which will be referenced by
MICP for full terminal control.

One item, not covered elsewhere, is the method which MIOP will use to
log off the terminal (and lesson) in the event of a mnemonic command
error. This will be done by returning a -1 status for the terminal write
request.

TABLE 3-1.   MIOP REFERENCED PLANIT COMMON ITEMS

ITEM NAME & DECLARATION		VALUES
ICHNUM	BIN FIXED	Current channel (terminal) number. 1, 2, 3 ...
MODES	BIN FIXED	1 - command mode 2 - identify yourself 3 - lesson 4 - system 5 - debug mode
NCALC	BIN FIXED	0 - not in CALC mode 1 - in CALC mode
NAMES (480)	BIN FIXED	NAMES(NTMP20) and NAMES(NTMP20 + 1) contain the lesson name being read
NTMP20	BIN FIXED	from or written on tape by PLANIT. The lesson name is used by MIOP for multi-lesson tape reels.

4.0 AUTHOR CONSIDERATIONS

4.1 Log-On in the Middle of a "CONTROL MODE" Lesson

Because of the possibility of logging on in the middle of a lesson, the author must carefully establish re-entry points within the lesson. This is done by placing a period after the frame type, e.g., FRAME 3.00 (Q.). The terminal will always be in the "NORMAL MODE" when a lesson is entered or re-entered.

4.2 Physical Terminal ID

The use of the SPECIAL call to the terminal requires one of the variables to be the physical terminal number. It is recommended that "TERMINAL", a new CALC item name, be used in the SPECIAL call directly such as:

FUNCTION CMODE = SPECIAL(1,1,TERMINAL,I,C,X,Y,Z,0,0)

Section 5.4 of "PLANIT LANGUAGE EXTENSIONS THROUGH VERSION 2.8" describes the new CALC item TERMINAL.

The first three variables (1,1,TERMINAL) could easily have been eliminated from the call, but allow for possible future expansion. The call (1,2,A,...) could, for instance, be implemented to allow a monitor lesson to obtain the status of another terminal in the system.

5.0 SYSTEM ERRORS AND SYSTEM OPERATOR ACTIONS

The possibility exists that terminal #1, the only ACC at this time,
being used for a "CONTROL MODE" lesson, might also be required for
a System Operator function at the same time. The following paragraphs
describe the problems.

5.1 Error Messages

The RD screen of terminal #1 has been used to report errors on various
devices. Although an operator may have become dependent on these
indications, the user manual points out that the messages are
informational and that PLANIT, START or FINAL will put out specific
messages requesting action, should any be required. Therefore,
the absence of the error report on the RD screen when in the
"CONTROL MODE" should not seriously affect the system.

5.2 System Operator Messages

While in the "CONTROL MODE" there are two types of operator messages:

1. Those from MIOP, for instance, a terminal #2 TAPE MOUNT
    REQUEST.

2. Those from PLANIT, for instance, a DIAL message from another
    terminal.

In the first case, a MIOP message, separate buffers are used and the
lesson status, etc., is saved. In the second case, a PLANIT message,
the message may be lost, put on the wrong screen and may have an
adverse affect on the lesson. These situations require further
investigation/discussion.

6.0 PROGRAMMING TASK

The following sub-paragraphs describe the general programming tasks involved in the implementation of the system enhancements described in this document.

6.1 COMPOOL Changes

The changes to the COMPOOL (the common data pool available to all support programs) are minor. The terminal buffer allocations will be involved and some changes/additions to flag bits and status words.

6.2 POS Changes

Changes to POS are required for the following:

1. Returning full ACC status to TMIOP.

2. Controlling VFMED/MIOP read buffer length per TMIOP direction.

3. Passing received messages (except Auto-Acks) to TMIOP processing.

6.3 TMIOP Changes

The changes to TMIOP are extensive and encompass the following:

1. Absorbtion of some original POS functions related to the terminals (ACC status and terminal received message processing).

2. Decoding the "CONTROL MODE" commands.

3. Providing the correct responses to PLANIT when in the "CONTROL MODE".

6.4 MIOP Changes

The changes to MIOP will be minimal, primarily passing the SPECIAL call onto TMIOP for processing.

6.5 Additional POS Changes

The following capabilities will be added to POS to facilitate remote terminal mode, device and channel assignment:

1. The ability to select 7 or 14-line mode for each terminal including the ACC.

2. The ability to assign each remote terminal as a MIOD, Old VFMED or New VFMED.

3. The ability to assign the DDT channel associated with each remote terminal or turn that terminal off.

4. The ability to turn on the NO-ACK mode for an Old or New VFMED terminal.

6.6 START Changes

Start will be modified to eliminate the "number of active terminals" message.

APPENDIX A

TERMINAL CONTROL

A-1.0 INTRODUCTION

A-1.1 Purpose and Scope

The purpose of this appendix is to describe the method by which a PLANIT
author may exercise complete control over the ACC/CCC, VFMED and MICD
terminals. The following definitions apply to this appendix:

    a.   "NORMAL MODE" - The normal mode of a PLANIT terminal.

    b.   "CONTROL MODE" - The mode of the terminal in which

         an author's lesson has complete control of the terminal.

The methods and commands are designed to allow existing lessons to run in
the "NORMAL MODE" without modification to those lessons. New lessons
prepared using the methods and commands described herein may make full
use of the "NORMAL MODE" and/or the "CONTROL MODE" to provide instruction
as well as simulation of ACC/CCC, VFMED and MICD operation under the
TACFIRE/TCS² Field Operating System.

The methods and commands described herein apply to PLANIT 2.8 and above
and do not require any modifications to the PLANIT programs.

A-1.2 Reference Documents

PLANIT LANGUAGE EXTENSIONS THROUGH VERSION 2.8; Charles H. Frye;
March 9, 1976.

A-2.0 TERMINAL COMMANDS

Two types of commands are used for a lesson to obtain control of the
terminal. The SPECIAL function call commands allow limited control
and can cause the "CONTROL MODE" to be entered. Mnemonic commands
which provide more precise control are used when in the "CONTROL MODE"
and are imbeded in the lesson text.

A-2.1   SPECIAL Function Call Commands

The calc function call SPECIAL is used to initiate the "CONTROL MODE",
select certain modes without entering the "CONTROL MODE" and as an alternate
form of the GET and GET-OFF mnemonic commands. The SPECIAL call to initiate
the "CONTROL MODE" is necessary so that the author can print and edit the
lesson without executing mnemonic commands. The SPECIAL function call is
described in Section 4.3 of "PLANIT LANGUAGE EXTENSIONS THROUGH 2.8".
The specific SPECIAL call commands implemented for terminal control are
described in the following paragraphs.

The format of the command is as follows:

$$SPECIAL(1,1,T,I,C,X,Y,Z,0,0)$$

where the arguments in the command are as follows:

T - Terminal number. The terminal number upon which the
    command will be executed.

I - Intended terminal type:

    0 - ACC, VFMED or MIOD (used with command 8 only)
    1 - ACC
    2 - VFMED
    3 - MIOD

C - Command:

    0 - Set 7-line mode
    1 - Set 14-line mode
    2 - Turn off NO-ACK mode (VFMED only)
    3 - Turn on NO-ACK mode (VFMED only)
    4 - Release "CONTROL MODE"
    5 - Enter "CONTROL MODE"
    6 - Turn off GET setup (same as mnemonic GET-OFF)
    7 - Setup GET function X,Y,Z. (same as mnemonic GET(M,N,O)
        except that X, Y and Z may be calc variables)

        X - Beginning line number
        Y - Beginning character number
        Z - Number of characters to be considered for answer

    8 - Return terminal type 1, 2 or 3 to lesson

Each SPECIAL call command will return an integer status which will be either of the following:

    a.   An error status (2) will be returned to PLANIT which will cause the lesson to terminate. An author will be placed in PLANIT COMMAND MODE which allows him to diagnose and fix the condition. A student will be logged off. The following conditions cause this response:

        1) A SPECIAL call is received when not in lesson mode.

        2) A SPECIAL call is received when in CALC mode.

        3) First two SPECIAL call variables are not 1,1. 1,1 stands for terminal control call, student lesson. This allows for expansion of SPECIAL call functions.

        4) T variable is not the same as current active channel number.

        5) I variable is not the same as actual terminal type — except $C = 8$.

        6) C variable not valid range (0 thru 8).

        7) $C = 2$ or 3 and I not equal to 2.

        8) $C = 7$ and not in "CONTROL MODE".

        9) $C = 7$ and X, Y or Z variable not valid.

    b.   An integer value will be returned to the lesson for each valid command as follows:

        1) For $C = 8$, the value returned will be: 1 (ACC), 2 (VFMED) or 3 (WIOD).

        2) For all other commands a 1 (command accepted) will be returned.

A-2.2 Mnemonic Commands

The mnemonic commands which control the terminal appear as output text
in a PLANIT lesson, for instance group 2 of a Q frame. Commands are
identified by 3 dollar signs "$$$" followed by commands separated by
spaces and ending with the CR-LF characters at the end of that line;
for example:

    $$$ CE-WRITE SA-CLEAR

Commands are executed as they are scanned. A write to the terminal
occurs, without operator intervention, when the screen buffer is complete.
Any illegal command will terminate the "CONTROL MODE", log off the
terminal (lesson) and display the following message:

    $$$ COMMAND ERROR: XXXXXXX
    $$$ NORMAL MODE RESUMED
    $$$ LESSON LOGGED OFF

XXX... is replaced by the unrecognized command.

Table A-1 shows the mnemonic commands which are applicable to all terminals
(ACC/OCC, VFMED and MIOD). Table A-2 and A-3 show the mnemonic commands
which are applicable to only the ACC/OCC. Table A-6 shows the various
mode selections, their default selection and how they are selected.
Figure A-2 shows a sample ACC lesson and Figure A-3 shows a sample VFMED
lesson making use of the commands described.

A-2.3 VFMED and MIOD Message Address Preambles

The "message address preamble" sent to a VFMED or MIOD determines what
will happen at the terminal. The preamble is the first 6 characters
of the message and its affect is described in detail in Appendix B.

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A-3.0   TERMINAL READ AND WRITE RESPONSES

The following paragraphs describe the responses to PLANIT reads and
writes when the terminal is in the "CONTROL MODE".

A-3.1   PLANIT Read

The responses to PLANIT read commands allow the author to read switch
actions taken by the student and the content of screen messages. The
first read response is reserved for returning a mnemonic answer string
indicating the switch action taken by the student. The first read is
conditioned by any of the following occurring before the read is issued:

    a.   Issuing a GET-OFF mnemonic command.

    b.   Issuing a ʔ command with a SPECIAL function call.
         (equivalent to GET-OFF mnemonic command)

    c.   Satisfaction of a previous GET setup with a prior read.

    d.   Any PLANIT write of data to the terminal. A write of a
         command line does not constitute data for the terminal. Such a
         line must begin with $$$ and end with $.

The first read may be a timed read and will only be satisfied when a
switch action has been taken or if selected the read timer expires.
The screen data is stored when an interruptable switch action is taken
and is available to the lesson by issuing a GET command (SPECIAL function
call or mnemonic) prior to a read. The GET command followed by a PLANIT
read causes an immediate return of the data stored. The stored data is
valid until the next write of data to the terminal. The processes
involved for the ACC/OCC and VFMED/MICD are discussed separately in
the following paragraphs.

A-3.1.1   ACC/OCC Read

When the operator presses an interruptable switch, the data on the CE
screen is read and saved for further processing. If the XMIT switch is
pressed then the data read and saved is from the cursor position to the EOT.

With any other interruptable switch action, the entire screen is saved independent of cursor position. This is a software convention consistant with the Field Operating System. The response to the first PLANIT read depends on operator action. The operator will either press an interruptable switch causing a mnemonic answer string to be returned to PLANIT or the read will time out (if selected in the lesson). The answer string returned will be mnemonics separated by spaces. The first mnemonic will be the switch which caused the interrupt as listed in Table A-4. Following that will be the matrix selection mnemonic followed by up to 5 message address selections. The matrix and message address selection mnemonic responses are listed in Table A-5.

A typical answer would be as follows:

CA C-3 MA

Indicates pressing the C/E D CMPTR ACTION switch caused the interrupt and that the matrix selection was C-3 and that MESSAGE ADDRESS indicator A was on.

The timed-out read is a special case and when it occurrs the CE screen will be read and saved. The timed-out read status will be returned to the lesson. No mnemonic answer string indicating the lack of a switch action will be returned to the lesson. The stored data is available by using the GET command and reading the data so that the author could check student progress in filling out an answer.

A-3.1.2   VFMED/MICD Read

The VFMED and MICD hardware differs from the ACC in that the ACC may be read at any time by the software while the VFMED and MICD may only be read when the terminal operator presses a switch. The first read response will be one of the 5 canned messages shown in Figure A-1 depending on the switch pressed. Screen data, from the cursor position to the first EOT

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or end of screen, is read and stored only when the XMIT switch is pressed.
This stored message is available to the lesson by using the GET command
followed by a PLANIT read. In the case of a timed-out read, the time-out
status is returned to the lesson but no data is available for the GET
command.

A-3.2   PLANIT Write

The PLANIT write function is normally straight forward. Data may be
directed to the ELP, C/F D screen or RD screen if the terminal is an
ACC. Data sent to a VFMED or MICD is processed at that terminal depending
on the message address preamble and the prior status of the terminal
(cursor position and COMPOSE MODE switch position).

Messages sent to a VFMED or MICD terminal must begin with a 6-character
message address preamble. The first character (message destination address)
of any message sent to a remote terminal will be checked for zero. If it is
not a zero, it will be forced to zero, the message type will be forced to
F and the message source character will be forced to J. For lesson
generated data the author should include the message address preamble as
the first part of each message. The forced message provision is intended
to allow for non-lesson generated messages such as "enter your answer" and
"numeric answer please".

It is also to be noted that GET reads addressed to a blank substring will
cause PLANIT to output "enter your answer" and cancel the GET command.
This in turn destroys the stored data and causes a wait for switch action
read to be started. To be on the safe side, GET reads should invoke the
timed read option and interpret time out as a blank answer.

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TABLE A-1   COMMAND LIST

COMMAND	DESCRIPTION
RELEASE	Returns the terminal to the "NORMAL MODE".
7-LINE	Sets the display buffer to process 7 lines of text and answers for PLANIT.
14-LINE	Sets the display buffer to process 14 lines of text and answers for PLANIT.
ACK	Causes ACK character (▶◀) to be placed on screen at the point where the first $ of the $$$ was encountered or immediately following the last ACK or NAK character.
NAK	Causes NAK character (▨) to be placed on screen at the point where the first $ of the $$$ was encountered or immediately following the last ACK or NAK character.
EOT	Causes EOT character (⊐) to be placed on screen at the point where the first $ of the $$$ was encountered or immediately following the last ACK or NAK character. Stops a write operation.
GET-OFF	Cancels a previously selected GET command. Normally a GET command will be cancelled when it has been satisfied by a PLANIT READ.
GET(M,N,O)	Conditions the next read to return up to 72 characters of the saved screen display. M, N and O are optional parameters which allow specification of the following:

      M - beginning line number (legal values 1 thru 7 (14)).

      N - beginning character number (legal values 1 thru 72).

      O - Number of characters to include (legal values 1 thru 72. Scanning will step at end of line or when the specified characters have been inspected).

The default values of the GET command are 1,1,72. The character string returned to PLANIT goes through the normal trailing blank suppression and a correct character count is returned to PLANIT. Legal forms of the GET command are as follows:

    GET   GET(2)   GET(3,4)   GET(4,1,6)

Any number of PLANIT reads, each preceeded by a GET command can be addressed to the saved screen so that any number of fields can be inspected.

TABLE A-2   ACC ONLY COMMAND LIST

COMMAND	DESCRIPTION
SA-CLEAR	Clear the SA panel status register and turn off all SA panel indicators.
CE-CLEAR	Clear the CE screen.
RD-CLEAR	Clear the RD screen.
CE-WRITE	This is the default selection. Designates that the following PLANIT text is to be written on the CE screen when complete. Completion is defined as any of the following conditions: a. 7 or 14 line buffer full. Excess will be ignored. b. Command string identifier ($$$) encountered. EOT, ACK and NAK commands will be processed before the write is activated. c. A PLANIT READ has been activated.
RD-WRITE	Designates that the following PLANIT text is to be written on the RD screen when complete.
ELP-WRITE	Designates that the following PLANIT text is to be written on the ELP only when complete.
COPY-ON	This is the default selection. Output which is directed to either screen is also printed on the ELP. A copy of the CE screen is also printed when a PLANIT READ request is active and an interruptable switch action has been taken.
COPY-OFF	Turns off the copy function of the ELP. Output directed to either screen is not printed nor are answers returned to PLANIT.

TABLE A-3   SA INDICATOR COMMAND LIST

ON COMMAND	OFF COMMAND	INDICATOR NAME
IS-ON	IS-OFF	ILL. SW ACTION
CB-ON	CB-OFF	CMPTR BUSY
SV-ON	SV-OFF	SAVE
PM-ON	PM-OFF	PRIORITY MESSAGE
Not applicable	MA-OFF	MESSAGE ADDRESS A
	MB-OFF	MESSAGE ADDRESS B
	MC-OFF	MESSAGE ADDRESS C
	MD-OFF	MESSAGE ADDRESS D
	ME-OFF	MESSAGE ADDRESS E
CT-ON	CT-OFF	C/E D TEST
RT-ON	RT-OFF	RD TEST

NOTE: MATRIX SWITCHES CANNOT BE TURNED ON OR OFF, EXCEPT
        BY OPERATOR ACTION.

        MESSAGE ADDRESS SWITCHES CANNOT BE TURNED ON, EXCEPT
        BY OPERATOR ACTION.

TABLE A-4   INTERRUPTABLE SWITCH ACTION SA READ RESPONSES

MNEMONIC	SWITCH NAME
PR	PRINT on C/E D keyboard
XM	XMIT on C/E D keyboard
PM	PRIORITY MESSAGE
CM	CYCLE MESSAGES
PG	PAGE
RX	RD XMIT
RA	RD CMPTR ACTION
DL	DELETE
TE	TRANSFER TO EDIT
CF	CHECK FIRING
CC	CANCEL CHECK FIRING
FP	FPF
SP	SPARE
CA	C/E D CMPTR ACTION
RP	REPLACE
SV	SAVE
RS	RESTORE
FC	FORMAT COMMAND
FS	FORMAT SELECT
IS	ILL. SW ACTION
RT	RD TEST
CT	C/E D TEST

TABLE A-5   MATRIX AND MESSAGE ADDRESS SA READ RESPONSES

MNEMONIC	SWITCH NAME
r-c	Row and column matrix selection. "r" will be either O (no row selection) or the letter for the row selected (A thru H). "c" will be either O (no column selected) or the number for the column selected (1 thru 8). For example:

    0-0 no selection.

    0-2 no row selection, column 2 selected.

    A-0 row A, no column selected.

    C-3 row C, column 3.

MA	MESSAGE ADDRESS A
MB	MESSAGE ADDRESS B
MC	MESSAGE ADDRESS C
MD	MESSAGE ADDRESS D
ME	MESSAGE ADDRESS E

NOTE: Matrix selections are mutually exclusive and only one matrix mnemonic will be returned.

Message Address selections are not mutually exclusive and up to five mnemonics will be returned.

TABLE A-6   MODE SELECTION MATRIX

	NORMAL MODE	NORMAL OR CONTROL MODE			
	VEWED ONLY	ALL TERMINALS		ACC ONLY	
	NC-ACK MODE ON/OFF	7-LINE 14-LINE	NORMAL/ CONTROL MODE	CE-WRITE RD-WRITE ELP-WRITE	COPY-ON COPY-OFF
DEFAULT SYSTEM INITIALIZATION	OFF	7-LINE	NORMAL	CE-WRITE	COPY-ON
1 POS PROGRAM INITIALIZATION	NC-ACK MAY BE SELECTED	14-LINE MAY BE SELECTED			
2 LOG ON, COMMAND MODE AND 1ST FRAME OF LESSON	↓	↓	↓		
3 SPECIAL FUNCTION CALL IN LESSON	MAY BE CHANGED	MAY BE CHANGED	MAY BE CHANGED	↓	↓
4 MNEMONIC COMMANDS IN "CONTROL MODE" LESSON	NOT APPLICABLE	MAY BE CHANGED	MAY BE RETURNED TO NORMAL	MAY BE CHANGED	MAY BE CHANGED
5 RESUME OLD LESSON WHICH WAS LOGGED OFF NORMALLY	SAME AS FROM 2 to 3 ABOVE				
6 RESUME OLD LESSON WHICH WAS LOGGED OFF DUE TO A COMMAND ERROR	SAME AS FROM 2 to 3 ABOVE				

A-13

1)   ACK switch pressed

J				X	O		M	A	C	K

2)   RE-XMIT switch pressed

J				X	O		M	N	A	K

3)   MESSAGE REQUEST switch pressed (MIOD only)

J				X	O		M	R

4)   XMIT switch pressed

*	*	*	*	*	*		M	S	G

X - 5 for VFMED, S for MIOD

****** - first 6 characters of message.

FIGURE A-1   PLANIT 1ST READ RESPONSE

FRAME 1.02 (0.) LABEL=ACC.

G2. TEXT
    1) THIS SAMPLE LESSON WILL TEST YOUR ABILITY TO OBTAIN AND USE
    2) A NAMED FORMAT SKELETON USING THE ACC IN THE SAME MANNER AS THE
    3) TACFIRE FIELD OPERATING SYSTEM.
    4) THE ONLY EXCEPTION IS THAT THE HD SCREEN WILL BE USED
    5) TO GIVE YOU DIRECTION.
    6) ENTER GO IF YOU UNDERSTAND.

G3. ANSWERS
    1) A=GO

G4. ACTIONS
    1) - F:YOU WILL HAVE TO TRY IT ANYWAY

FRAME 2.00 (0)

G2. CRITERIA
    1) (: FUNCTION WHO = SPECIAL(1,1,TERMINAL,0,8,4,0,8,2,2)
    2) IF WHO NO 1 H:FR6
    3) ELSE
    4) C: FUNCTION SEVEN=SPECIAL(1,1,TERMINAL,1,P,2,2,0,4,8)
    5) IF SEVEN NG 1 R:URESP
    6) ELSE
    7) (: FUNCTION CONTR=SPECIAL(1,1,TERMINAL,1,5,8,2,0,2,0)
    8) IF CONTR NG 1 H:URESP

FRAME 3.00 (0)

G2. TEXT
    1) A.K SA=CLEAR CF=CLEAR HD=CLEAR HD=WRITE
    2) LOOK AT THE FORMAT/COMMAND MATRIX.
    3) LOCATE THE SYSIMDS ENTRY.
    4) ACTIVATE THE ROW SWITCH (A THRU H) AND COLUMN SWITCH (1 THRU 8)
    5) CORRESPONDING TO THE SYSIMDS ENTRY.
    6)
    7) PRESS FORMAT SELECT TO CALL UP THE MESSAGE SKELETON.

G3. ANSWERS
    1) " KEYWORD ON
    2) A=FS R=H
    3) = FS
    4) C R=H

G4. ACTIONS
    1) A F:8
    2) - H:TRY AGAIN. HINT (ROW H, COLUMN 6)
    3) C H:TRY AGAIN. HINT (PRESS FORMAT SELECT)
    4) - REACTIVATE ROW 8, COLUMN 6, THEN PRESS FORMAT SELECT

FIGURE A-2.   SAMPLE ACC LESSON   (Sheet 1 of 3)

A-15

FRAME 4.00 (G)

G2. TEXT
1) BELOW ON THE C/E D SCREEN IS THE SYS/MDS SKELETON.
2) TO ACTIVATE AN M&D PROGRAM, PUT A P IN THE MSEL FIELD
3) AND P IN THE CPUD FIELD. THIS REQUESTS PRIORITY EXECUTION
4) OF THE CPU FAULT DETECTION PROGRAM.
5) PRESS C/E D CMPTR ACTION AFTER ENTERING THE SKELETON.

FRAME 5.00 (Q)

G2. TEXT
1) SSS CE-WRITE
2)   ;P; ;SB; / / /   /   ;C;   ;SG;   , ;DT;   , / /   ;ID;   ;A; ;
3) SYS;MDS;MSEL; ;CMUD; / ;CPUD; / ;LLOOP; / ;KGD; / ;RAMD; / ;
4) ARM1D; / ;ARM2D; / ;ELP1D; / ;ELP2D; / ;ACCD; / ;ETDD; / ;
5) DPMD; / ;DDTAD; / ;DDTBD; / ;DDTCD; / ;DDTDD; / ;DDTED; / ;
6) DDTFD; / ;DDTGD; / ;DDTHD; / ;ARM1I; / ;ARM2I; / ;ELP1I; / ;
7) ELP2I; / ;ACCI; / ;ETDI; / ;DPMI; / ;BUUI; / ;RLOOP; / ;
8) VFMED; / ;FFMED; / ;BDU; / ;DIVBN; / SSS EOT

FRAME 5.50 (Q)

G2. TEXT
1) SSS RD-WRITE

G3. ANSWERS
1) W KEYWORD ON
2) A-CA

G4. ACTIONS
1) A F;$
2) - R;PRESS C/E D CMPTR ACTION SWITCH

FRAME 6.00 (Q)

G2. TEXT
1) SSS GET(2,9,7)

G3. ANSWERS
1) W WAIT 1
2) A MSEL;P

G4. ACTIONS
1) ' R;URESP
2) A F;$
3) - F;TRY AGAIN (P AFTER MSEL;) B;5.5

FIGURE A-2.   SAMPLE ACC LESSON   (Sheet 2 of 3)

G2. TEXT
    1) *S$ GET(2,28,7)

G3. ANSWERS
    1) *WAIT 1
    2) A+ CPUD;P

G4. ACTIONS
    1) * H;URESP
    2) A F;$
    3) = F;PART RIGHT, TRY AGAIN (P AFTER CPUD;) B;5.5

FRAME 8.xx (G)

G2. TEXT
    1) *S$ RELEASE

FRAME 9.xx (R)

G2. TEXT
    1) DISPLAY HAS BEEN RETURNED TO NORMAL LESSON MODE
    2) THANK YOU FOR YOUR ATTENTION

G4. ACTIONS
    1) R;EXIT

FRAME 10.xx (R) LABEL;ERR

G2. TEXT
    1) THIS LESSON MUST BE TAKEN ON ACC ONLY.

G4. ACTIONS
    1) R;EXIT

FRAME 11.xx (P) LABEL;URESP

G2. STATE FCTS
    1) SPECIAL(1,1,TERMINAL,1,4,M,P,P,A,W,W)

FRAME 12.xx (J)

G2. TEXT
    1) UNEXPECTED RESPONSE TO "CONTROL MODE" ACTION

FRAME 20.00 (W) LABEL;EXIT

G2. TEXT
    1) LESSON ENDED.

S*

FIGURE A-2.   SAMPLE ACC LESSON   (Sheet 3 of 3)

FRAME 1.43 (0.) LABEL=VFMED.

G2. TEXT
    1) THIS IS A SAMPLE LESSON FOR THE VFMED
    2) USING MNEMONIC COMMANDS AND MESSAGE
    3) ADDRESS PREAMBLES TO OBTAIN THE DESIRED
    4) RESULTS. \\
    5) UNLESS OTHERWISE DIRECTED, BEFORE TAKING
    6) ANY SWITCH ACTION, DO THE FOLLOWING:
    7)   1. RESET THE CURSOR
    8)   2. SET THE COMPOSE MODE SWITCH TO OFF \\
    9) PRESS THE RE-XMIT SWITCH
    10) (DONT FORGET, CURSOR RESET AND COMPOSE MODE OFF)
    11) IF YOU FORGET, READ THE INSTRUCTIONS
    12) PRINTED ON THE PRINTER, S

FRAME 2.00 (0)

G2. CRITERIA
    1) C: FUNCTION WHO = SPECIAL(1,1,TERMINAL,0,8,0,0,0,0,0)
    2) IF WHO NO 2 B:ERR
    3) ELSE
    4) C: FUNCTION SEVEN=SPECIAL(1,1,TERMINAL,2,0,0,0,0,0,0)
    5) IF SEVEN NO 1 B:URESP
    6) ELSE
    7) C: FUNCTION CONTM=SPECIAL(1,1,TERMINAL,2,5,0,0,0,0,0)
    8) IF CONTM NO 1 B:URESP

FRAME 3.00 (0)

G3. ANSWERS
    1) ? KEYWORD ON
    2) A+MVAR

G4. ACTIONS
    1) A F:000003J CORRECT, NOW PRESS ACK (DONT FORGET) $$$ EOT S
    2) - F:000003J WRONG, PRESS RE-XMIT (DONT FORGET) $$$ EOT S

FRAME 4.00 (0)

G3. ANSWERS
    1) ? KEYWORD ON
    2) A+MACK

G4. ACTIONS
    1) A F:*
    2) - F:000003J WRONG, PRESS ACK (DONT FORGET) $$$ EOT S

FIGURE A-3.   SAMPLE VFMED LESSON   (Sheet 1 of 5)

FRAME 5.88 (R)

G2. TEXT
    1) M4W4J GOOD, NOW YOU COMPOSE A MESSAGE CONSISTING
    2) OF THE MESSAGE ADDRESS PREAMBLE "J1113R"
    3) FOLLOWED BY THE WORD "FIRE" FOLLOWED BY THE FOT CHARACTER.
    4) RESET CURSOR. COMPOSE MODE ON, THEN PRESS XMIT.
    5) NEXT, WHEN THE MESSAGE LIGHT GOES ON
    6) RESET CURSOR, COMPOSE MODE OFF, THEN PRESS ACK. SSS FOT S

G3. ANSWERS
    1) A KEYWORD ON
    2) A+J1113R MSG
    3) B J1113:
    4) C MSG

G4. ACTIONS
    1) A F:S
    2) M F:S B:1A
    3) C F:S H:1?
    4) * F:S F:1A

FRAME 7.MC (M)

G2. TEXT
    1) SSS GET(1,7,1.)

G3. ANSWERS
    1) M WAIT 1
    2) A+FIRE

G4. ACTIONS
    1) * H: IRESP
    2) A F:S
    3) * F:S P:14

FRAME 8.MM (R)

G2. TEXT
    1) M4M4J SSS EOT S

G3. ANSWERS
    1) A+MACK
    2) B+UNAK

G4. ACTIONS
    1) A F:S H:2A
    2) M F:S H:2.
    3) * F:S A:2.

FRAME 10.MM (W)

FIGURE A-3. SAMPLE VFMED LESSON (Sheet 2 of 5)

A-19

G2. TEXT
    1) AØ0M3J SSS EOT S

G3. ANSWERS
    1) A+MACK

G4. ACTIONS
    1) A F;S
    2) - F;S

FRAME 11.ØØ (C)

G2. TEXT
    1) MAM 3J YOU DIDNT PRESS XMIT ON THE KEYBOARD.
    2) THE FIRST LINE OF THE SCREEN SHOULD READ AS FOLLOWS:
    3) J1113M FIRE "EOT CHARACTER"
    4) PRESS ACK TO TRY AGAIN SSS EOT S

G4. ACTIONS
    1) A;19

FRAME 12.ØK (H)

G2. TEXT
    1) MAMA3J SSS EOT S

G3. ANSWERS
    1) A+MACK

G4. ACTIONS
    1) A F;S
    2) - F;S

FRAME 13.ØØ (I)

G2. TEXT
    1) MAMA3J YOU DIDNT GET THE PREAMBLE RIGHT.
    2) THE FIRST LINE OF THE SCREEN SHOULD READ AS FOLLOWS:
    3) J1113M FIRE "EOT CHARACTER"
    4) PRESS ACK TO TRY AGAIN SSS EOT S

G4. ACTIONS
    1) A;19

FRAME 14.ØM (G)

G2. TEXT
    1) MAMA3J SSS EOT S

FIGURE A-3.   SAMPLE VFMED LESSON   (Sheet 3 of 5)

G3. ANSWERS_ .
    1) A+MACK

G4. ACTIONS
    1) A F;9
    2) - F;9

FRAME 15.MP (J)

G2. TEXT
    1) M3P*3J YOU FORGOT THE WORD FIRE.
    2) THE FIRST LINE OF THE SCREEN SHOULD READ AS FOLLOWS:
    3) J1113* FIRE "EOT CHARACTER"
    4) PRESS ACK TO TRY AGAIN $$$ EOT $

G4. ACTIONS
    1) R;19

FRAME 19.MM (C)

G3. ANSWERS
    1) ? KEYWORD: ON
    2) A+MACK

G4. ACTIONS
    1) A F;$ R;6
    2) - F;$ R;6

FRAME 2N.2N (W)

G2. TEXT
    1) M3P*3J YOU DID A FINE JOB
    2) AND THIS LESSON IS DONE
    3) $$$ EOT RELEASE

FRAME 21.MP (W)

G4. ACTIONS
    1) R; EXIT

FRAME 3W.MP (W) LABEL+ERR

G2. TEXT
    1) THIS LESSON MUST BE TAKEN ON VFMED ONLY

G4. ACTIONS
    1) F; EXIT

FIGURE A-3.   SAMPLE VFMED LESSON   (Sheet 4 of 5)

A-21

```
FRAME 31.00 (P) LABEL=URESP

G2. STATEMENTS
    1) SPECIAL(1,1,TERMINAL,2,4,4,0,4,0,3,0)


FRAME 32.00 (0)

G2. TEXT
    1) UNEXPECTED RESPONSE TO "CONTROL MODE" ACTION

G4. ACTIONS
    1) 0: EXIT


FRAME 33.00 (0) LABEL=EXIT

G2. TEXT
    1) LESSON COMPLETE


$$$$
```

FIGURE A-3.   SAMPLE VFMED LESSON   (Sheet 5 of 5)

VFMED/MIOD MESSAGE ADDRESS PREAMBLES

B-1.0 INTRODUCTION

B-1.1 Purpose and Scope

Every message transmitted by or received by a VFMED or MIOD has a message address preamble. The purpose of this appendix is to describe the format of the preamble, the effect a received preamble has on the terminal and the preambles generated by the terminal. The detail presented is intended to give a PLANIT author a basic understanding of the terminal communication formats.

B-1.2 Reference Documents

The material described in this appendix was derrived from the following documents:

       EL-CP-00041107 B   CEI SPECIFICATION FOR VARIABLE FORMAT MESSAGE
                            ENTRY DEVICE (VFMED)

       EI-CP-2507-PO   PRIME ITEM DEVELOPMENT SPECIFICATION FOR
                            MESSAGE INPUT OUTPUT DEVICE (MIOD)
                            FOR TOS2

B-1.3 Terms

The following terms are defined for convenience so that subsequent reference to the terms will not require confusing explanation when used:

    a.   VFMED - when used without "old" or "new" applies to either.

    b.   Old VFMED - The VFMED hardware associated with the original and Mod-88 TACFIRE configurations.

    c.   New VFMED - The VFMED hardware associated with the TACFIRE LP configuration. It consists of all new hardware, the heart of which is a Remote Data Terminal (RDT). The RDT includes a microprocessor, expanded control pannel and is more versatile than the original VFMED.

    d.   Terminal Address - The terminal address is determined by the ELP CHANNEL SELECT switch for the old VFMED or MIOD and is one of 8 numbers 0 thru 7. The terminal address for a new VFMED is determined by the RDT source address thumb-wheel setting and may be set to any character. PLANIT operations require this number to be set to 0 for all terminals.

B-1.3 Terms (continued)

    e. Computer Address - The address which the computer software
        will accept and/or generate for messages. The letter J is
        used for PLANIT operations. The new VFMED RDT destination
        address should be set to J for PLANIT operations.

B-2.0 MESSAGE ADDRESS PREAMBLE

The first 6 characters of every message transmitted by or received by
a VFMED or MIOD are a message address preamble. Figure B-1 shows
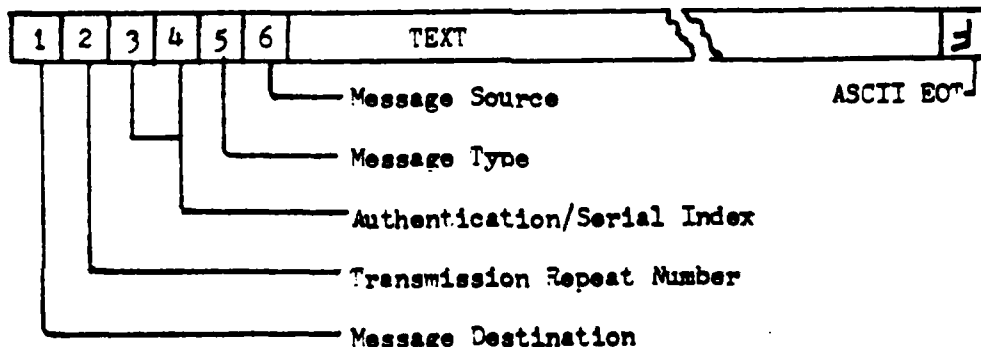the format of a message and defines the characters in the preamble.

FIGURE B-1 Message Format

B-2.1 Message Destination Character

The first character of the preamble is the message destination character.
A received message is ignored by a VFMED or MIOD unless the destination
character matches the terminal address.

The message destination character of a composed message transmitted
by a VFMED or MIOD is determined by one of the following means:

    a. Old VFMED or MIOD - The message destination character is the
        1st character of the transmitted message.

    b. New VFMED - The message destination character is the thumb-
        wheel selected on the RDT and replaces the 1st character
        of the composed message.

When a message is directed to the computer the message destination
character should be the letter J for PLANIT operations.

B-2

B-2.2 Authentication Characters

The 2nd, 3rd and 4th characters of the preamble are the authentication characters. These characters are used to determine the authenticity of a message in a tactical operational system. PLANIT operation treats these characters as normal alpha-numeric characters and places no restriction on either the operator or lesson author as to their content.

B-2.3 Message Type Character

The 5th character of the preamble is the message type designation. When a message is received at a terminal, this character determins what happens to the message and other terminal reactions (see B-3.0).

For composed messages transmitted by the terminal this character has significance only in a tactical operational system (see B-3.0). For PLANIT operation the character may be any alpha-numeric character.

B-2.4 Message Source Character

The 6th character of the preamble is the message source character. For messages sent by the computer the character will be the letter J. The message source character of a composed message transmitted by a VFMED or MICD is determined by one of the following means:

    a. Old VFMED or MIOD - The message source character is the 6th character of the transmitted message.

    b. New VFMED - The message source character is the thumb-wheel selected RDT source address and replaces the 6th character of the composed message.

When a message is composed to be sent to the computer the message source character should be the number 0 for PLANIT operation.

B-3.0 TERMINAL REACTION TO RECEIVED MESSAGE TYPE CHARACTERS

The 5th character of a message received by a VFMED or MICD terminal determins what happens on the terminal. The VFMED and MIOD react differently and are described in separate sub-paragraphs.

B-3.1 VFMED Terminal reactions

Six message type characters are defined for the TACFIRE VFMED. The terminal reaction to any of these or any undefined message types is as follows:

    a. All messages (except type 5) including the preamble will be printed on the FLP. Type 5 messages are acknowledgment messages received from the computer.

B-3

B-3.1 VFMED Terminal Reactions (continued)

b. All messages (except type 5) will be written on the DE
    screen, from the original cursor position, if the
    COMPOSE EDIT switch is in the off position.

c. If the message type was 4 (test) then an ELP self-test
    will be performed. This causes   a   test message
    to be printed following the original message.

d. Indicators on the ELP are illuminated as shown in Table B-1.

TABLE B-1. VFMED Message Type and Indicator Reaction

MESSAGE TYPE	MEANING	INDICATOR ACTION
1	Check Firing	Turns on CHECK FIRING indicator.
2	Fire Mission	Turns on FIRE MISSION indicator.
3	New Message	Turns on MESSAGE indicator.
4	Test	Turns on MESSAGE indicator.
5	Acknowledge	Does not affect indicators.
6	Relay	Turns on MESSAGE indicator.
other	Undefined	Turns on MESSAGE indicator.

B-3.2 MIOD Terminal Reactions

Message type characters received by the MIOD select the terminal
reaction. It is possible to selectively output a message to the DE
screen and/or ELP or neither and turn indicators on or off and
sound the alarm. Table B-2 gives the MIOD reactions to various
message type characters.

B-4

TABLE B-2. MICD Message Type and Terminal Reaction

MSG TYPE	OUTPUT TO DE	OUTPUT TO ELP	MSG WAITING LIGHT	PRIORITY MESSAGE WAITING LIGHT	ALARM ON
A	YES	YES	ON	OFF	YES
B	YES	YES	ON	OFF	NO
C	YES	YES	OFF	ON	YES
D	YES	YES	OFF	ON	NO
E	YES	YES	OFF	OFF	YES
F	YES	YES	OFF	OFF	NO
G	YES	NO	ON	OFF	YES
H	YES	NO	ON	OFF	NO
I	YES	NO	OFF	ON	YES
J	YES	NO	OFF	ON	NO
K	YES	NO	OFF	OFF	YES
L	YES	NO	OFF	OFF	NO
M	NO	YES	ON	OFF	YES
N	NO	YES	ON	OFF	NO
C	NO	YES	OFF	ON	YES
P	NO	YES	OFF	ON	NO
Q	NO	YES	OFF	OFF	YES
R	NO	YES	OFF	OFF	NO
S*	NO	YES	-	-	-
	NO	NO	ON	OFF	YES
U	NO	NO	OFF	ON	YES
Δ	TEST MESSAGE				

* This message is an acknowledgement received from the computer.
An acknowledgement is not returned, and lights and alarms are
unaffected. ith all other message arrivals, lights and alarms
are turned either on or off.

B-4.0 GENERATED MESSAGES

The VFMED and MIOD both generate 9-character canned messages in response to received messages (auto-Ack) and in response to switch activations on the terminal. These canned messages are shown in Table B-3 for the VFMED and in Table B-4 for the MIOD.

TABLE B-3. VFMED Generated Messages

SWITCH ACTIVATED	MESSAGE GENERATED	COMMENT
none	J | | | 5 | 0 | A | ✕ | ◸	Auto-Ack message, generated after any message received except a type 5.
ACK	J | | | 5 | 0 | M | ✕ | ◸	Manual-Ack message.
RE-XMIT	J | | | 5 | 0 | M | ✕ | ◸	Manual-Nak message.

TABLE B-4. MIOD Generated Messages

SWITCH ACTIVATED	MESSAGE GENERATED	COMMENT
none	J | | | S | 0 | A | ✕ | ◸	Auto-Ack message, generated after any message received except a type S.
ACK	J | | | S | 0 | M | ✕ | ◸	Manual-Ack message.
RE-XMIT	J | | | S | 0 | M | ✕ | ◸	Manual-Nak message.
MESSAGE REQUEST	J | | | S | 0 | M | R | ◸	Message Request message.